Lake Tahoe Total Maximum Daily Load
Urban and Groundwater Focus Team
Meeting Summary

September 11, 2007, 8am – 10:45 am

Session 1 objective: Discuss potential options for reducing urban and groundwater sources of fine particles, nitrogen and phosphorus to Lake Tahoe

---

Meeting Attendees: Scott Cecchi, Nicole Beck, Brent Wolfe, Ed Wallace, Penny Stewart, Sarah Hussong Johnson, Liz Harris, Charlie Donohue, Paul Nielsen, Scott Brown, Audrey McCombs, Marc Grismer, My-Linh Nguyen, Michael Hogen, Russ Wigart, Kevin Drake, Lauri Kemper, Mark Kiesler, Gary Garofalo, Jag Grewal, Kansas McGanhan, Barbara Shanley, John Johnson, Steve Kooyman, Anand Moganti, Rick Robinson, Tim Hogan, Robert Erlich, Steve Looke, Elizabeth Harrison, Hannah Schembri, Kim Gorman, John Reuter, Chad Praul, Bob Larsen, Doug Smith, John Riverson, Larry Benoit, Jeremy Sokulsky, Jack Landy, Michele Sweeney (facilitator), Dave Roberts, Rebecca Bryson (note-taker)

Overview of the Presentations

Introduction and Opening Statements

The facilitator opened the meeting by explaining that that this was the first meeting of the Urban and Groundwater Focus Team, comprised mainly of agency staff. She noted that there are three other focus teams meeting: Atmospheric Deposition, Forest Uplands, and Stream Channel. The objectives of the meeting were:

1. To update the Focus Team on the latest TMDL-related research and answer any initial questions and clarify the materials presented.
2. To get feedback from the Focus Team on how the information is organized and presented prior to the first public presentation
3. To receive input on potential options for reducing atmospheric sources of fine particles, nitrogen and phosphorus to Lake Tahoe, and
4. To provide recommendations on additional research needed or policy matters raised by proposed pollution controls.

Water Board Presentation:

Bob Larsen, the Project Leader from the Lahontan Regional Water Quality Control Board (Water Board) gave a brief overview of the TMDL process and findings to date. This presentation and the most recent documents produced by the TMDL can be found at: http://www.waterboards.ca.gov/lahontan/TMDL/Tahoe/Tahoe_Index.htm.

Urban Uplands and Groundwater Experts' Presentation

Ed Wallace presented the work of this source category group. Their presentation is available at the URL listed in the previous paragraph. A summary of their analysis can be found in section 3.2 of the Lake Tahoe TMDL Pollutant Reduction Opportunity Report, also available at the URL above.

Question and Comment Period

The Urban Uplands and Groundwater source category group and members of the TMDL team answered a variety of questions during the session.

Pollutant Control Options: Have there been any source reduction strategies that have been taken off the table already because of cost? No, cost was only used as one factor that affected placement of pollutant controls in Tiers. Cost and public acceptability will be considered at later meetings with the Focus Team and Pathway Forum. The information presented today does not represent a prescriptive approach; it is intended to start the discussion of what is possible.

EMCs from BMPs: How were the EMCs (event mean concentrations) from BMPs on the ground measured and calculated? The team reported that they had been measured for two years from 16 specific sites and those numbers were used for the Watershed Model. These values were generally the same ones used for load reduction calculations, but literature values were used when local values were not available.

Hydraulic Calculations: Do hydraulic calculations consider multiple storm events? Yes, the team used a long hydraulic record, which includes calculations on a hourly basis over several years. This method helped the team look at total volume and long-term performance.

Cost Estimates: There were several questions about the cost estimates. It was noted that the cost estimates were not necessarily linear. The team also noted that while Pump and Treat Tier did not assume Tier 2 operations were in place, it did assume a Tier 1 level of conveyance to get the water to the treatment storage/stations. The team also stressed that the cost estimates provided included a 20 year maintenance plan in the estimate and the personnel to run those operations. Ed Wallace explained that the increase in performance often corresponded with increased cost/frequency in O&M. It was also explained that the cost included storwater collection infrastructure along streets and associated repaving costs.

The team noted that the reason Tier 2 was so expensive (in line with the Pump and Treat Tier) was that it included fairly expensive and extensive operations that would involve more rigorous maintenance than Tier 1 to operate efficiently. For the Pump and Treat option, they would only be applied in concentrated settings and would be more cost effective. The group discussed whether it would be more reasonable to show cost of settings/acre or other performance versus cost metrics.

Clarification of Treatment Tiers: There were several questions about how Tier 1 and Tier 2 were defined and what type of Tier 2 treatment technologies were included. The team explained that each Tier represented a combination of PCOs. Tier 1 consisted of incremental improvements above current EIP projects that they deemed achievable based on existing BMPs. For Tier 2, they assumed greater application of BMPs within project areas, and more advanced treatments such as media filtration. Tier 2 includes both wider

geographic coverage of project areas and more intensive application within the projects. For example, Tier 2 includes deicers and more efficient vacuum sweepers. Slide 12 and the table on page 118 in the Pollutant Reduction Opportunity report provide more detail. The team noted that Tier 2 involved increased O&M cost both by amount of existing facilities as well as in terms of increased frequency.

Definition of Urban Upland Area: The team explained that the settings were defined by GIS analysis. Any area that was greater than 1% impervious cover was considered Urban Upland (see page 109 of the report). Most of these subwatersheds include a large proportion of the highways around the Lake.

Numerical Values of Reduction Rates: There was a question about the basis for the numerical values used to derive reductions (was it modeled, field research/measurements and/or expert opinion)? For Pollutant Source Controls (PSCs), the main inputs were revised land use EMCs (event mean concentrations). Thus the Watershed Model for existing conditions uses characteristic EMCs, developed from monitoring in the Lake Tahoe basin. So when PSCs are applied, the land use conditions are improved, so the team needed to account for that in the quality of the runoff.

The effects of hydrologic source controls were primarily estimated by estimating physical parameters such as volume and infiltration rates, so for a particular size of Hydrologic Source Control (HSC), the team used the Watershed Model to estimate performance based upon specified design parameters. Stormwater treatment performance was based primarily on information from the ASCE international BMP database.

They team confirmed that the numbers from the TMDL monitoirng a few years back fed into these numbers. The majority of data was Tahoe-specific (for example, from Caltrans). The team stated that they attempted to characterize well-treated, controlled run-off quality based on available data, and to distinguish that from Watershed Model land use (generally untreated) EMC values.

Total Load Reduction Associated with Infiltration: There was a question about how much load reduction is achieved by infiltration (the questioner assumed it was not 100% because some percent of DP and DN make it to the lake) but they wanted clarification on the "treatment efficiency" of groundwater. The team explained that for tier 1, the Watershed Model estimates a 7% reduction in runoff volume, for Tier 2, a 15% reduction, but this runoff would be infiltrated to groundwater. However, the team also stressed that better quality water would be infiltrated thus less pollutants would reach the groundwater.

How Much Reduction is Needed: There were several questions about how much total reduction is needed (from Urban Uplands) according to the clarity model? It seems like the approach here is to estimate the effects of chosen actions rather than to determine pollutant reductions needed first, then choose the PCOs to provide that level of reduction.

The rationale for trying to estimate what reductions could be achieved in each source category at this stage in the process is to help TMDL team and other agencies in the Basin determine what load reduction activities seem most promising. Once the options and the potential reductions of each are clearer, then the Water Board can feed this information back into the model to determine more specific numbers in each source categories.

Exclusion of "Non-quantifiable" PCOs: There was a question about how the Water Board plans to acknowledge/encourage those PCOs that are not measurable but that may still provide significant benefit. Water Board staff indicated that they would continue to support the implementation of such actions and that once better tools for quantification are developed, these controls will be brought into the analysis. However, for now non-measurable options are not included in the report. It was noted that source control BMPs, in particular, are typically the most difficult to quantify in the Urban and Groundwater source category.

It was also stressed that the TMDL is currently looking at this data from the 30,000 foot level. The team stressed that the approach they used was not to evaluate the impact of specific source controls per se, but rather evaluate the question of what level of EMCs is achievable with pollution controls.

John Reuter stressed that if one looks at the question from an even higher level, we first need to answer the general question of whether it is even possible to implement enough BMPs to achieve the clarity required. He noted that no one had that information before now. He explained that once the whole spectrum of options is understood/analyzed, we can then focus on the most promising candidates.

Tier 2 and (Pump and Treat Tier): Larry Benoit asked about the relationship between Tier 2 and Pump and Treat Tier. He noted that in the analysis some Tier 2 may be applied to subwatersheds that have functional limitations, such as high groundwater, which would indicate that that PCO combination might not work well there and that a pump and treat option might be more effective there. He suggested that there may be additional potential for load reduction if the analysis included HSC or PSC. He noted that he was involved in a study at Kings Beach that might be able to evaluate some of these issues. The team noted that the Tiers were not intended to be additive because only one could be implemented on the same land area. However, the Pump and Treat Tier was only applicable to a fraction of the urban area and other Tiers could be applied to the complimentary area.

A Placer County representative reported that in the initial estimates of costs for a pump and treat (type of) system at Kings Beach had an estimated 90% efficiency of removal for a cost of $40m, whereas for an overall 76% efficiency, the estimated costs are only $8m.

The team stressed that the pump and treat option <u>does</u> include the cost of the collection system. In terms of performance, however, the team focused on how much was captured and how clean it was at the end and thus it does not include the potential effects of the

capture step. Meeting participants noted that because the team did not consider intensive PSCs with the pump and treat option, the cost/benefit numbers may not necessarily reflect all the benefits. The team noted that the additional benefits are still unclear because by adding PSCs at the upper end, it does not necessarily reduce pollutant loads; however, they acknowledged that it might reduce O&M costs.) The report acknowledges that the team had the least confidence in the performance/load reductions estimated related to pump and treat because several assumptions were required to estimate how much stormwater could be captured and pumped.

Bob Larsen acknowledged the good points raised and noted that given time and resource constraints, the pump and treat option will be further analyzed through a feasibility analysis that will provide the type of information necessary to study this option at a finer scale.

There were several follow up questions about the point of discharge. The team noted that they assumed the point of discharge would be directly into the lake. However, the team noted that there were many options/variables related to the pump and treat option that had to be assumed including the size of the infrastructure, how much storage, how much pumping and the location of the outfall which all affect how much is captured, how much is bypassed. These are some of the types of issues that will be addressed in the TRPA study mentioned earlier.

There was a question about discharge limitations and the team reported that the discharge limitations assumed for the effluent concentrations were .5mg/l for FS (which might be too high), 0.09 mg/l for phosphorus, and no decrease for DN. Larry Benoit noted that there are several aspects of how a pump and treat option could affect pollutant loads/effluent concentrations, particularly if a wetland system is employed, and that this would be considered further in the TRPA feasibility study. Larry explained that the TRPA study is, <u>not</u> a demonstration project. The purpose of the study is to take a broader look at what it would take to establish a working pump and treat system, to have it be functional over a 20 year O&M cycle and to develop criteria to evaluate certain concentrated subwatersheds or communities where it would make sense.

Suggested Future Study/Next Steps:

- Conduct more intensive studies on the cost/benefit of a pump and treat option and how to make it more efficient based on information from future TRPA study.
- Combined Tier 2 and Pump and Treat analysis should be conducted in terms of its feasibility to determine the ultimate achievable reduction for urban stormwater.

Effluent Limits: There was a question about the status of effluent limits in the Basin Plan and whether they are enforceable or whether the focus is shifting to load reductions. Water Board staff reported that the effluent limits are still in the Basin Plan (approved in 1980). The deadline for compliance, at which time they will be enforceable, is November 2008. Staff noted that the Water Board is moving to a load-based approach – and the TMDL will provide such a load-based approach. However, until such time that

this approach is approved, the effluent limits are the basis for regulation. The Water Board does anticipate having some type of transition plan between November 2008 and 2010 when the TMDL is expected to be adopted, but they have not talked with their authorities yet.

Watershed Burn Area: There was a question about how the wildfire/burned areas affect the numbers. Fire is included as a land use application in the Watershed Model. But it includes primarily historic – prescribed and wildfires. Anticipated burns are not included. It was also asked whether there will be a difference in runoff from urban areas as people start to create greater areas of defensive space. The TMDL team noted that the Watershed Model could be used to analyze anticipated actions such as each property owner creating 30 feet of defensive space around their structure.

Future Build Out/Growth: There was a question about if and how future change/growth has been factored in and if not whether a foreseeable, reasonably conservative future condition – including climate change - be modeled and used to develop wasteload allocations. The team noted that both urban growth build out and climate change had been studied in previous Watershed Model analyses.

Use of Clarity Model to Date: There were several questions about the extent to which any of the numbers provided had been used in the Clarity Model to predict load reductions, and whether the model is a transient or steady state model (it is the former). It was pointed out that the cities/stormwater agencies were most interested in the end goal of what actions they would be required to take as part of the TMDL efforts to restore Lake clarity. It was noted that the Clarity Model had not been used to run the numbers yet, but this work would be available in the reasonably near future.

Effectiveness of BMPs: There was a question about BMPs and whether the Watershed Model could predict their effectiveness. John Reuter noted that while the Clarity Model could not predict the effectiveness of specific BMPs, it did show that if we had a magic wand and could reduce the pollutant load by the prediction 55% today, in 10 or 15 years only, the Lake would return to its 30m of clarity fairly soon. He also pointed out that the number we are aiming for of 30m in clarity was a reality in the Lake only 30 years after the Comstock period, so the Lake can and does respond rapidly to changes.

Groundwater Loading: There was a question to confirm that the groundwater loading was analyzed in combination with the urban runoff tiers and that the net outcome was not adverse if mitigations are implemented and whether other adverse or favorable consequences of these tiers was considered (e.g. benefits to air quality of road sweeping, improved vacuuming).

Additional Questions Not Addressed at the Meeting:

- Was an effort made to specify how much a particular treatment option, hydrologic control concentrates on biological forms and nutrients?
- Was an effort made to quantify biologically available forms of nitrogen and phosphorus in the different source categories and how different treatment options?

- Was there any consideration of construction of in-stream weirs to force backflooding and increase sediment deposition in the upgradient floodplain? In other words, is it possible to model an approach to have a net gain in floodplain sedimentation using in-stream controls?

Issues to Consider and Suggested Future Studies

- Conduct pump and treat feasibility study
- Use Clarity Model to determine impact of various pollutant control strategies
- Assess implications of increased defensible space and other fire risk reduction measures
- Confirm that future growth/development is addressed (e.g. via application of USGS land use model)
- Further consider climate change impacts
- Use Clarity Model to determine time and duration for expected lake response based on: TMDL implementation schedule, climate change
- Determine how to assess and consider non-quantifiable PCOs
- Verify/support conclusion that GW loads will decrease even with increased hydrologic loading due to emphasis on infiltration.
- SWQIC (Storm Water Quality Improvement Committee) should address studies needed to assess effectiveness of existing BMPs

Wrap-up and Next Steps

The facilitator thanked the Focus Team for their input and emphasized the importance of the Focus Team members attendance at the follow up meetings outlined below:

September 27th 8am to 5pm: Pathway Forum Workshop

October 11th 8am to 5pm: TMDL Focus Team Meeting (with all Teams Together)

October 25th 8am to 5pm: Pathway Forum Workshop

December 6th: 8am to 5pm: Pathway Forum Workshop

February 7th: 8am to 5pm: Pathway Forum Workshop and Focus Team Mtg Final